

REMARKS

The Examiner affirmed the restriction requirement for the reasons previously mentioned on Election Restriction paper dated April 8, 2003. The Examiner acknowledges the Applicants' election with traverse of claims 1-13 in Paper No. 7. The Examiner comments that the traversal is on the grounds that the product and process claims should be examined as part of the same application without adding a burden to the Examiner because of the close interrelationship between the product and process claims.

The Applicants respectfully submit that the traversal is on the grounds that the Examiner failed to meet the criteria for a proper restriction requirement because the reasons given by the Examiner for to the alleged independence or distinctness of the claimed invention are insufficient. The Examiner previously argued, "the PCB recited in claim 1 can be made through curing a silicon deposit first before printing the silicon composition". However, one skilled in the art would recognize that printing can be carried out on a silicone composition, but not on the cured product of a silicone composition. Therefore, it is not possible to carry out the process in an opposite order. The Examiner failed to demonstrate the independence or distinctness of the invention as claimed because claim 1 does not relate to a PCB or a PWB and because the semiconductor package as claimed cannot be made by the process proposed by the Examiner, therefore, the Examiner failed to show that the product as claimed can be made by another and materially different process.

Claim 1 relates to a semiconductor package comprising a semiconductor wafer having an active surface and at least one cured silicone member covering at least a portion of the active surface. Claim 14 relates to a method of making the semiconductor package. The semiconductor package of claim 1 could be used in conjunction with a PCB or PWB, however, the semiconductor wafer is not a PCB or a PWB.

The Examiner rejected claims 1-12 under 35 U.S.C. §103(a) as being unpatentable over Amako in view of Shephard because the Examiner believes that Figure 1 of Amako shows a semiconductor wafer, which inherently possesses an active surface, bonding pads, and a cured silicone covering a portion of the active surface, and the silicone member comprising an organopolysiloxane containing an average of at least two silicon-bonded alkenyl groups per

molecule, an organohydrogensiloxane containing an average of at least two silicon-bonded hydrogen atoms per molecule, an inorganic filler, and a hydrosilylation catalyst, and heating the silicone deposit to form the cured silicone member. The Examiner concludes that because Amako discloses a cured silicone member having the same composition as Applicant's disclosure, it is obvious that the cured silicone of Amako has a coefficient of linear expansion and a modulus in a vicinity of the range recited in the pending claim.

The Examiner further argues that Amako discloses a composition of a semiconductor packaging substantially identical to the pending claim except an inorganic filler with a specified surface area. The Examiner further argues that Shephard discloses an inorganic silica filler for a curable silicon, which is identical to the material recited in the Applicant's specification. The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to use silica for the filler of Amako with the disclosure of Shephard because a reinforcing silica filler increases mechanical properties in the heat cured silicon composition.

Amako discloses a curable organopolysiloxane composition comprising (A) an organopolysiloxane containing an average of at least two alkenyl groups and at least two silicon-bonded hydrogen atoms per molecule, (B) a compound containing alkenyl and hydroxyphenyl groups in each molecule, and (C) a hydrosilylation catalyst (paragraph [0008]). The composition may contain reinforcing fillers for the purpose of improving the strength (paragraph [0038]). Amako further discloses a unified article comprising a substrate and a cured product of the organopolysiloxane composition (paragraph [0040] and Figure 1). The unified article may be an epoxy resin substrate having a silicon chip thereon and a cured product of the organopolysiloxane composition (Figure 1). The problem to be solved by Amako is to provide a curable organopolysiloxane composition wherein the silicone component that out-migrates by effusion from the composition is highly curable and adherent to a variety of substrates and the organopolysiloxane composition has excellent adhesion to a wide variety of substrates (paragraphs [004] and [0006]).

Shephard discloses curable silicone rubber composition with improved flame resistance at heat flux rates of 50 to 90 kW(col. 2, lines 56-58). The silicone rubber formed from the composition is used as insulation and jacketing materials for transmission media plenum cables

(col. 1, lines 5-9). The curable silicone rubber composition contains silica filler having a specific surface area of at least about $50 \text{ m}^2/\text{g}$, and preferably 150 to $400 \text{ m}^2/\text{g}$ (col. 4, lines 59-66).

One skilled in the art would not be motivated to combine the disclosures of Amako and Shephard. Amako and Shephard are not within the same field of endeavor because Amako discloses a silicone composition for use in preparing a cured silicone as part of a unified article with a substrate, while in contrast Shephard discloses silicone rubbers used as insulation and jacketing materials for transmission media plenum cables. The fields of Amako and Shephard are different. Furthermore, the disclosures of Amako and Shephard are not directed to solving the same or similar problems because the purpose of Amako is to improve adhesion while the purpose of Shephard is to improve flame resistance.

Furthermore, even if one skilled in the art did combine the disclosures of Amako and Shephard, by adding the silica filler having a specific surface area of at least about $50 \text{ m}^2/\text{g}$ disclosed by Shephard to the curable organopolysiloxane composition of Amako, this would not provide a reasonable expectation of success to arrive at this invention.

This invention relates to a semiconductor package comprising:

a semiconductor wafer having an active surface comprising at least one integrated circuit, wherein each integrated circuit has a plurality of bond pads; and

at least one cured silicone member covering at least a portion of the active surface, wherein at least a portion of each bond pad is not covered by the silicone member, the silicone member has a coefficient of linear thermal expansion of from 60 to $280 \mu\text{m}/\text{m}^\circ\text{C}$ between -40 and 150°C and a modulus of from 1 to 300 MPa at 25°C , and the silicone member is prepared by a method comprising the steps of:

(i) printing a silicone composition on the active surface to form a silicone deposit, wherein the silicone composition comprises:

(A) an organopolysiloxane containing an average of at least two silicon-bonded alkenyl groups per molecule,

(B) an organohydrogensiloxane containing an average of at least two silicon-bonded hydrogen atoms per molecule in a concentration sufficient to cure the composition,

(C) an effective amount of an inorganic filler having a surface area less than $25 \text{ m}^2/\text{g}$,
and

(D) a catalytic amount of a hydrosilylation catalyst; and

(ii) heating the silicone deposit for an amount of time sufficient to form the cured silicone member.

The composition of Amako lacks component (A) used in the composition in the semiconductor package of claim 1. Component A of Amako has both alkenyl and silicon-bonded hydrogen atoms in the same molecule. Component (A) of this invention has alkenyl groups and other organic groups bonded to silicon atoms (paragraph [0029]). Component (A) therefore does not contain silicon-bonded hydrogen atoms, as required for component A of Amako. Adding the silica filler disclosed by Shephard to the composition of Amako does not cure this defect. Therefore, this invention is not obvious over Amako in view of Shephard because adding a silica filler of Shephard to the curable organopolysiloxane composition of Amako does not provide a reasonable expectation of success to arrive at this invention because component (A) of this invention is missing from the disclosure of Amako.

Furthermore, Shephard does not teach or suggest component (C) of this invention because the silica filler disclosed by Shephard has a specific surface area of at least about $50 \text{ m}^2/\text{g}$ (col. 4, lines 59-66). Shephard teaches away from this invention because the silica filler disclosed by Shephard has a specific surface area that is preferably 150 to $400 \text{ m}^2/\text{g}$ (col. 4, lines 61-66). In contrast, component (C) of this invention is an inorganic filler having a surface area less than $25 \text{ m}^2/\text{g}$, which is outside the scope of silica filler disclosed by Shephard. Nothing in the disclosure of Shephard would motivate one skilled in the art to substitute a filler having a surface area less than $25 \text{ m}^2/\text{g}$ for the filler that Shephard expressly provides must have a specific surface area of at least about $50 \text{ m}^2/\text{g}$ and preferably 150 to $400 \text{ m}^2/\text{g}$. Nothing in the disclosure of Shephard or Amako teaches or suggests that modifying the silica filler of Shephard to have a different specific surface area and adding that filler to the composition of Amako would provide a benefit.

Therefore, the present invention is not obvious over Amako in view of Shephard because Amako fails to teach or suggest component (A) of this invention and Shephard teaches away from component (C) of this invention. A prima facie case of obviousness has not been established

under MPEP §2143 because Amako and Shepard fail to teach or suggest all of the claim limitations of this invention. The Applicants request that the Examiner withdraw rejection of claims 1-12 under 35 U.S.C. §103(a) and allow the claims to issue.

In addition, Amako does not expressly disclose an active surface or bonding pads. For the above reasons, the present invention is not obvious over Amako in view of Shepard. The Applicants request that the Examiner withdraw rejection of claims 1-12 under 35 U.S.C. §103(a) and allow the claims to issue.

The Examiner rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Amako in view of Shepard as applied to claim 1 above and further in view of Fjelstad because the Examiner believes Amako and Shepard show a silicon wafer with a structure substantially identical to this invention except for connection of a metal trace. The Examiner further argues that Fjelstad shows a semiconductor package comprising a semiconductor wafer having an active surface comprising at least one integrated circuit, wherein each integrated circuit has a plurality of bond pads, a cured silicone layer with a thickness range of 74-200 micrometers covering a portion of the active surface of the wafer except the bond pads, and a metal trace having a proximal end attached to each bond pad and a distal end lying on the surface of the cured silicone layer. The Examiner concludes that it would have been obvious to have a connection of the metal trace to a bond pad and a cured silicone layer because such a configuration alleviates stresses created between the substrate and the chip.

Claim 13 is not obvious for the same reasons discussed above for claims 1-12. The disclosure of a metal trace by Fjelstad does not cure the defects of Amako in view of Shepard discussed above. Therefore, the present invention is not obvious over Amako in view of Shepard and further in view of Fjelstad. The Applicants request that the Examiner withdraw rejection of claim 13 under 35 U.S.C. §103(a) and allow all claims to issue.

Claims 30-32 have been added to the application to replace claims 20-22, which were previously cancelled. The applicants respectfully request rejoinder of claims 14-19 and 23-32 pursuant to MPEP §821.04. Support for claim 30 may be found at paragraph [0049]. Support for claim 31 may be found at paragraph [0050]. Support for claim 32 may be found at paragraphs [0055] and [0056]. The amendments do not add new matter to the application.

The Applicants have particularly pointed out and distinctly claimed the subject matter that they regard as their invention, and the instant invention is novel and unobvious. Reconsideration of the application is requested.

The present reply is being submitted within the three month response period for response to the outstanding office action. Although the Applicants believe in good faith that no extensions of time are needed, the Applicants hereby petition for any necessary extensions of time. You are authorized to charge deposit account 04-1520 for any fees necessary to maintain the pendency of this application.

Respectfully Submitted,
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